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[Bulletins 151 to 163 constitute the Report for 1908. In binding, pages i-xii at the end of this bulletin should be detached and placed before Bulletin 151, which begins with page 1.]

Maine Agricultural Experiment Station

BULLETIN No. 163.

DECEMBER, 1908.

FINANCES, METEOROLOGY, INDEX.

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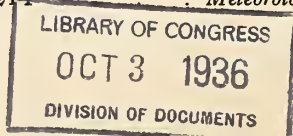
MAINE AGRICULTURAL EXPERIMENT STATION ORONO, MAINE.

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JAMES M. BARTLETT	} <i>Members of the Station Staff</i>
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ANNIE M. SNOW	<i>Clerk and Stenographer to the Director</i>
BLANCHE F. POOLER	<i>Stenographer</i>
HENRY A. MILLETT	<i>Meteorological Observer and Janitor</i>



METEOROLOGICAL OBSERVATIONS.

Lat. $44^{\circ} 54' 2''$ N. Lon. $68^{\circ} 40' 11''$ W. Elevation 150 feet.

The instruments used at this Station are the same as those used in preceding years, and include: Wet and dry bulb thermometers; maximum and minimum thermometers; rain-guage; self-recording anemometer, vane, and barometer. The observations at Orono now form an almost unbroken record of forty years.

The year 1908 differed from the average year in several very important respects. Every month but three was warmer than the average. January was especially warm, the mean temperature for the month being 6.4° higher than the average for the past 40 years. The highest temperature reached was 97° on July 7; and the lowest -24° on February 5. May and October were warm months, and but for the prolonged droughts of June and September the growing season would have been exceptionally long.

The precipitation for the year was light, over six inches below the average. During the period of 47 days, from June 1 to July 17 inclusive, only 2.10 inches of rain fell; and from August 18 to October 1 inclusive, 48 days, the total precipitation was .99 inch.

METEOROLOGICAL SUMMARY FOR 1908.
Observations Made at the Maine Experiment Station.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.	Total.
Highest barometer.....	30.26	30.59	30.30	30.28	30.35	30.20	30.23	30.19	30.29	30.40	30.31	30.50	30.32	
Lowest barometer.....	28.96	29.14	29.28	29.02	29.17	29.56	29.51	29.50	29.56	29.26	29.12	29.06	29.26	
Mean barometer.....	29.76	29.86	29.91	29.69	29.81	29.84	29.88	29.89	29.93	29.97	29.78	29.84	29.85	
Highest temperature.....	52° 0	49° 0	55° 0	79° 0	82° 0	88° 0	97° 0	90° 0	88° 0	82° 0	56° 0	59° 0		
Lowest temperature.....	-12° 0	-24° 0	-5° 0	9° 0	30° 0	36° 0	42° 0	37° 0	29° 0	20° 0	12° 0	-18° 0		
Mean temperature.....	22° 5	17° 4	29° 6	40° 0	55° 1	65° 1	71° 2	65° 6	62° 5	51° 0	35° 6	20° 3	44° 66	
Mean temperature for 40 years.....	16° 1	18° 8	28° 0	40° 6	52° 5	61° 9	67° 1	65° 0	57° 5	45° 1	34° 2	20° 5	42° 27	
Total precipitation in inches.....	3.36	4.23	2.90	2.37	4.59	1.35	2.85	4.69	.81	6.03	1.39	2.94	.....	37.51
Mean precipitation for 40 years.....	4.24	3.82	4.25	2.88	3.52	3.51	3.27	3.47	3.36	3.84	3.67	3.75	.....	43.58
No. of days with precip. of .01 in. or more	12	10	7	10	13	3	11	10	4	5	9	14	.....	108
Snow fall in inches.....	10.7	21.2	18.0	6.3	.....	.....	.....	.....	.....	.....	2.0	15.0	.....	73.2
Average snow fall for 40 years.....	22.6	21.3	16.0	5.6	0.2	.....	.....	.....	.....	0.8	8.0	16.9	.....	91.4
Number of clear days.....	16	13	6	10	9	17	15	12	22	17	8	11	.....	156
Number of fair days.....	2	5	11	9	5	9	10	9	3	4	7	9	.....	83
Number of cloudy days.....	13	11	14	11	17	4	6	10	5	10	15	11	.....	127
Total movement of wind in miles.....	6452	5215	6411	7854	5634	5030	4290	4759	3744	3999	5687	4793		

Monthly and Annual Precipitation (as rain) for the Year 1908.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Bar Harbor.....	4.89	5.88	3.40	3.25	3.75	1.65	3.50	2.23	2.25	5.63	1.69	5.95	44.07
Cornish.....	2.85	4.67	1.90	2.95	5.47	0.65	2.66	2.62	1.54	3.41	1.47	3.63	33.82
Eastport.....	4.17	3.71	3.96	2.64	2.58	1.01	1.95	3.32	1.60	4.09	1.52	5.01	35.56
Fairfield.....	1.61	3.68	1.77	1.93	4.52	2.17	2.41	3.05	0.56	3.64	.....	2.07	.....
Farmington.....	.....	4.44	2.82	2.38	5.88	2.05	2.82	4.87	1.48	2.59	1.63	3.10	33.42
Gardiner.....	2.65	4.58	2.17	2.20	4.29	1.03	4.38	2.36	0.92	4.16	1.40	3.28	42.42
Greenville.....	2.63	4.93	2.95	2.14	5.50	2.83	5.18	7.75	1.90	2.08	1.94	2.59	24.88
Houlton.....	1.89	4.75	2.51	2.25	2.20	2.00	1.30	3.57	0.49	1.35	1.07	1.50	36.13
Lewiston.....	2.82	4.68	2.18	2.64	4.94	0.90	3.66	2.73	0.80	5.01	1.61	4.16	38.53
Madison.....	2.75	4.52	2.48	2.56	6.59	1.63	3.91	5.18	1.40	3.51	1.53	2.47	33.20
Millinocket.....	2.52	3.82	2.65	1.93	5.16	2.10	2.35	5.01	2.46	.....	1.88	3.32	37.51
North Bridgton.....	2.43	3.65	2.20	2.58	4.51	1.00	5.34	3.55	0.81	2.40	1.46	3.27	30.92
Orono.....	3.36	4.23	2.90	2.37	4.59	1.35	2.85	4.69	.....	6.03	1.39	2.94	.....
Patten.....	.....	.....	.....	.....	.....	.....	1.51	5.00	0.30	.....	.....	.....	.....
Portland.....	.....	3.72	2.26	2.14	4.76	0.53	2.58	3.73	0.69	3.65	1.34	2.92	30.92
Rumford Falls.....	2.84	4.08	1.95	1.73	5.90	1.42	2.30	3.62	1.26	1.96	1.48	2.38	.....
Van Buren.....	2.55	4.90	2.10	2.00	5.10	2.80	2.10	3.45	0.75	3.60	1.55	.....	.....
Winslow.....	2.07	3.10	1.78	2.07	5.00	2.82	2.73	.....	0.93	3.08	.....	2.57	.....

With the exception of readings from the Orono station, the above table is compiled from the monthly bulletins of the U. S. Weather Bureau.

REPORT OF TREASURER FOR FISCAL YEAR ENDING JUNE 30, 1908.

Receipts.	Hatch Fund.	Adams Fund.	Gen'l Acct.
Balance July 1, 1907.....			\$3,583 96
Treasurer of United States.....	\$15,000 00	\$9,000 00	
Inspection, sales, etc.....			10,238 70
Disbursements	\$15,000 00	\$9,000 00	\$13,822 66
Salaries	\$7,683 40	\$6,406 24	\$7,914 29
Labor	756 55	7 50	
Publications	259 65		17 00
Postage and stationery.....	485 65	26 40	293 43
Freight and express.....	320 58	30 58	67 89
Heat, light and power.....	548 67	30 50	97 57
Chemical supplies	142 76	15 05	312 15
Seeds, plants and sundry supplies...	380 75	1,036 62	34 68
Feeding stuffs	1,576 87		597 95
Library	467 94	388 99	73 27
Tools, implements and machinery...	110 86	12 10	14 10
Furniture and fixtures.....	569 89		
Scientific apparatus	341 07	206 79	
Live stock	96 92	67 00	2 00
Traveling expenses	481 63	401 75	1,396 66
Contingent expenses	28 50		
Buildings	748 31	370 48	1,171 26
Balance June 30, 1908.....			1,830 41
Total	\$15,000 00	\$9,000 00	\$13,822 66

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TWENTY-FOURTH ANNUAL REPORT

OF THE

Maine Agricultural Experiment Station

ORONO, MAINE.

1908

WATERVILLE

SENTINEL PUBLISHING COMPANY

1909

MAINE AGRICULTURAL EXPERIMENT STATION ORONO, MAINE.

ORGANIZATION JANUARY TO JUNE, 1908.

THE STATION COUNCIL.

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ORGANIZATION JULY TO DECEMBER, 1908.

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The Bulletins of this Station will be sent free to any address in Maine.
All requests should be sent to

Agricultural Experiment Station,
Orono, Maine.

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ANNOUNCEMENTS.

THE AIM OF THE STATION.

Every citizen of Maine concerned in agriculture has the right to apply to the Station for any assistance that comes within its province. It is the wish of the Trustees and Station Council that the Station be as widely useful as its resources will permit.

In addition to its work of investigation, the Station is prepared to make chemical analyses of fertilizers, feeding stuffs, dairy products and other agricultural materials; to test seeds and creamery glassware; to identify grasses, weeds, injurious fungi and insects, etc.; and to give information on agricultural matters of interest and advantage to the citizens of the State.

All work proper to the Experiment Station and of public benefit will be done without charge. Work for the private use of individuals is charged for at the actual cost to the Station. The Station offers to do this work only as a matter of accommodation. Under no condition will the Station undertake analyses, the results of which cannot be published, if they prove of general interest.

CORRESPONDENCE.

As far as practicable, letters are answered the day they are received. Letters sent to individual officers are liable to remain unanswered, in case the officer addressed is absent. All communications, should, therefore, be addressed to the Director or to the

Agricultural Experiment Station,
Orono, Maine.

The post-office, railroad station, freight, express and telegraph address is Orono, Maine. Visitors to the Station can take the electric cars at Bangor and Old Town.

The Station is connected by telephone.

HISTORICAL NOTES FOR 1908.

PUBLICATIONS.

The Experiment Station publishes during the year several bulletins which make up the annual report for the year. All bulletins issued by the Station are sent to the names upon the official mailing list prepared by the Office of Experiment Stations, to all newspapers of Maine, to libraries and to agricultural exchanges. Bulletins which have to do with general agriculture including feeding stuff, fertilizer and seed inspection are sent to the general mailing list. Publications having to do with food and drug inspection are sent to a special list including all dealers in Maine and other citizens who request them. The annual report is sent to directors and to libraries.

BULLETINS PUBLISHED IN 1908.

No. 151.	Food and Drug Inspection	48 pages
No. 152.	Seed Inspection	36 pages
No. 153.	Fertilizer Inspection	24 pages
No. 154.	Paris Green. Bordeaux Mixture	16 pages
No. 155.	Orchard Notes, 1907	32 pages
No. 156.	Feeding Stuff Inspection.....	48 pages
No. 157.	Poultry Work at the Maine Station	16 pages
No. 158.	Food of Man Studies	20 pages
No. 159.	Appliances and Methods for Pedigree Poultry Breeding	36 pages
No. 160.	Fertilizer Inspection	36 pages
No. 161.	Saddled Prominent.....	40 pages
No. 162.	Insect Notes for 1908.....	36 pages
No. 163.	Meteorology, Finances, Index.....	10 pages

MISCELLANEOUS PUBLICATIONS PUBLISHED IN 1908.

The following miscellaneous publications were issued in 1908. The newspaper bulletins were sent to the press of the State and to exchanges. The Official Inspections were food and drug publications and were sent to all dealers in Maine, and other citizens who requested them.

Food and Drug Inspection No. 13 (M. F. D. R. 12, 13 and 14)	4 pages
Food and Drug Inspection 14. (M. F. D. R. 15 and 16)	4 pages
Official Inspections No. 1.....	8 pages
Official Inspections No. 2.....	8 pages
Official Inspections No. 3.....	8 pages
Official Inspections No. 4.....	8 pages
Official Inspections No. 5.....	8 pages
Official Inspections No. 6.....	8 pages
Forest Tent Caterpillar.....	6 pages
Prentiss Aroostook Complete Fertilizer.....	8 pages
How to Fight Potato Enemies.....	14 pages
Newspaper Bulletin,—Wild Mustard.....	1 page
Newspaper Bulletin,—Damage by the Prominent Caterpillar	1 page
Newspaper bulletin,—Two Potato Diseases New to Maine	1 page
The New Maine Station Trap Nest.....	8 pages
Organization and Work of the Department of Biology	8 pages
Notice to Dealers in Agricultural Seeds in Maine.....	2 pages
List of bulletins published in 1907.....	1 page
Newspaper Notice of Bulletin 149.....	1 page
Newspaper Notice of Bulletin 151.....	1 page
Newspaper Notice of Bulletin 152.....	1 page
Newspaper Notice of Bulletin 153.....	1 page
Newspaper Notice of Bulletin 154.....	1 page
Newspaper Notice of Bulletin 155.....	1 page
Newspaper Notice of Bulletin 156.....	1 page
Newspaper Notice of Bulletin 157.....	1 page
Newspaper Notice of Bulletin 158.....	1 page
Newspaper Notice of Bulletin 159.....	1 page

TECHNICAL PUBLICATIONS.

The bulletins of the Station contain the results of the work of investigation. It frequently happens, however, that much of the work of investigation is of so technical a nature as not to warrant its distribution to the general mailing list of the Experiment Station. The work of this kind is sometimes published in the bulletins of the Station and sent out to a special mailing list or sometimes published in technical journals or other places. There is given below a complete list of the biological and entomological publications for 1908. Some of these have been printed in Station bulletins and others elsewhere as indicated.

A limited number of the complete sets of the biological publications and of the entomological publications for 1908 are available for exchange with laboratories and institutions working in similar lines. Correspondence relative to the affecting of such exchanges should be addressed to Director Charles D. Woods, Maine Agricultural Experiment Station, Orono, Maine, U. S. A.

Biology Publications 1908.

1. Certain Points Concerning the Probable Error of the Standard Deviation, by R. Pearl. *Biometrika*, Vol. 6, pp. 112-117, 1908.
2. A Biometrical Study of Egg Production. Part I. Variation in Annual Egg Production. By R. Pearl and F. M. Surface. Bulletin 110 Bureau of Animal Industry, U. S. Dept. Agr. (In press.)
3. Fecundity of Swine, by F. M. Surface. *Biometrika* Vol. VI.
4. The Frequency Constants of the Variable $z=f(x^1, x^2)$ by R. Pearl. *Biometrika*, Vol. VI.
5. Resection and End-to-End Anastomosis of the Oviduct in the Hen without Loss of Function, by R. Pearl and F. M. Surface. *American Journal of Physiology*, Vol. 22, pp. 357-361. 1908.
6. Appliances and Methods for Pedigree Poultry Breeding, by R. Pearl and F. M. Surface. *Maine Agricultural Experiment Station Bulletin* No. 159, pp. 239-274. 1908.

7. Studies on the Physiology of Reproduction in the Domestic Fowl. L. Regulation in the Morphogenetic Activity of the Oviduct, by R. Pearl. Journal of Experimental Zoölogy. Vol. 6.
8. Data on Variation in the Comb of the Domestic Fowl. Biometrika, Vol. VI.
9. On the use of Atropin Sulphate in Anaesthetizing Birds for Surgical Experiments. Jour. Amer. Med. Asso., Vol. LII, pp. 382-383.

Entomology Publications 1908.

- No. 29. *Crocigrapha normani*, Grote, Entomological News July 1908.
- No. 30. *Pemphigus Tessellata*. Alternate host. Migrants and True Sexes. Entomological News 1908.
- No. 31. The Saddled Prominent. Bulletin 161.
- No. 32. Insect Notes for 1908. Bulletin 162.

Inspection Publications.

Prior to July, 1908, the results of all the inspection work conducted by the Experiment Station were printed in the bulletins of the Station. A new series of publications under the title of "Official Inspections" was begun with July, 1908, and before the close of the year six of these publications were issued; practically all having to do with the work of the food and drug inspection.

The bulletins for 1908 contain, as in the past, the full report of the feeding stuffs, fertilizer and agricultural seed inspections. Beginning with 1909 none of the work of inspection will be published in the regular bulletins of the Station, but will appear in the Official Inspections.

As in the past, the work of inspection which has to do with agricultural seeds, fertilizer and feeding stuffs will be sent to the general list. Official Inspections containing the results of work under the Food and Drug Law will be sent to a special list including all dealers in Maine and other citizens who request them. Official Inspections will not be sent to the official mailing list of the office of Experiment Stations or to non-residents of the State except on special request. The six Official Inspections for 1908 are bound in as an appendix to the annual report of the Station.

*Inspection Publications 1908.**Feeding Stuffs Inspection.*

Bulletin 15648 pages

Fertilizer Inspection.

Prentiss Aroostook Complete Fertilizer (Circular).... 8 pages

Bulletin 15324 pages

Bulletin 16036 pages

Food and Drug Inspection.

Bulletin 15136 pages

Official Inspections 1 to 6.....48 pages

Food and Drug Regulations 12 to 16 (Circulars).... 8 pages

Seed Inspection.

Bulletin 15236 pages

CHANGES IN STATION STAFF.

June 30, 1908, Prof. L. H. Merrill resigned from the Experiment Station staff to devote his whole time to teaching in the University. Mr. Merrill had been on the Experiment Station staff since 1885 and had the longest continuous service, with one exception, of any member of the staff.

Mr. Arthur C. Whittier, assistant chemist, resigned June 30, 1908 to accept a similar position in the Ohio Experiment Station.

June 1 the Department of Veterinary Science which was under the charge of Prof. F. L. Russell for a number of years, was discontinued. The major portion of Dr. Russell's time during the past few years has been given to the work of instruction in the University. He is continuing his connection with the Station since July 1 doing special work in the Department of Biology.

Dr. Chas. E. Lewis, was appointed Associate Pathologist and entered upon his duties July 1.

Joseph F. Merrill who did special work in the Experiment Station during the fall of 1907 and winter of 1908 was regularly appointed assistant chemist July 1, 1908.

Miss Maynie R. Curtis was appointed assistant in biology and began her work August 1, 1908.

Miss Alice W. Averill was appointed laboratory assistant in entomology and began her work in August, 1908.

BUILDINGS.

A small greenhouse 15 x 30, for the use of the Pathologists and Entomologist was erected on the south of the Experiment Station building. It is divided into three rooms with arrangements for automatically controlling the temperature. A small potting shed is connected.

The frame poultry house, known as No. 1, was abandoned and torn down in the summer of 1908. At the east end of poultry house No. 2, a house was erected for a poultry hospital and special physiological investigations with poultry.